

**Practice Worksheet** # 1**Real Exponents and Exponential Functions****Simplify each expression.**

1.  $(2^{\sqrt{2}})^{\sqrt{18}}$

2.  $13^{\sqrt{6}} \cdot 13^{\sqrt{24}}$

3.  $125^{\sqrt{11}} \div 5^{\sqrt{11}}$

4.  $(n^{\sqrt{3}})^{\sqrt{75}}$

5.  $32^{\sqrt{3}} \cdot 16^{\sqrt{2}}$

6.  $(r^{\sqrt{3}} + p^{\sqrt{5}})^2$

7.  $(n^{\sqrt{6}} + w^{\sqrt{3}})(n^{\sqrt{6}} - w^{\sqrt{3}})$

8.  $(r^{\sqrt{3}} \cdot p^{\sqrt{5}})^2$

**Solve each equation.**

9.  $7^{6x} = 7^{2x-20}$

10.  $3^{6x-5} = 9^{4x-3}$

11.  $9^{2x-1} = 27^{x+4}$

12.  $5^{2x+3} = (\sqrt{5})^{x+4}$

13.  $2^{3x-1} = \left(\frac{1}{8}\right)^x$

14.  $\left(\frac{1}{16}\right)^{x+1} = \left(\frac{1}{8}\right)^{2x-1}$

**Practice Worksheet****Real Exponents and Exponential Functions****Simplify each expression.**

1.  $(2^{\sqrt{2}})^{\sqrt{18}}$   **$2^6$  or 64**

2.  $13^{\sqrt{6}} \cdot 13^{\sqrt{24}}$   **$13^{3\sqrt{6}}$**

3.  $125^{\sqrt{11}} \div 5^{\sqrt{11}}$   **$5^{2\sqrt{11}}$**

4.  $(n^{\sqrt{3}})^{\sqrt{75}}$   **$n^{15}$**

5.  $32^{\sqrt{3}} \cdot 16^{\sqrt{2}}$   **$2^{5\sqrt{3}+4\sqrt{2}}$**

6.  $(r^{\sqrt{3}} + p^{\sqrt{5}})^2$   
 **$r^{2\sqrt{3}} + 2r^{\sqrt{3}}p^{\sqrt{5}} + p^{2\sqrt{5}}$**

7.  $(n^{\sqrt{6}} + w^{\sqrt{3}})(n^{\sqrt{6}} - w^{\sqrt{3}})$   
 **$n^{2\sqrt{6}} - w^{2\sqrt{3}}$**

8.  $(r^{\sqrt{3}} \cdot p^{\sqrt{5}})^2$   **$r^{2\sqrt{3}} \cdot p^{2\sqrt{5}}$**

**Solve each equation.**

9.  $7^{6x} = 7^{2x-20}$  **-5**

10.  $3^{6x-5} = 9^{4x-3}$   **$\frac{1}{2}$**

11.  $9^{2x-1} = 27^{x+4}$  **14**

12.  $5^{2x+3} = (\sqrt{5})^{x+4}$   **$-\frac{2}{3}$**

13.  $2^{3x-1} = \left(\frac{1}{8}\right)^x$   **$\frac{1}{6}$**

14.  $\left(\frac{1}{16}\right)^{x+1} = \left(\frac{1}{8}\right)^{2x-1}$   **$\frac{7}{2}$**

# Practice Worksheet

## Logarithms and Logarithmic Functions

Write each equation in logarithmic form.

1.  $5^3 = 125$

2.  $27^{\frac{4}{3}} = 81$

Write each equation in exponential form.

3.  $\log_{10} 0.00001 = -5$

4.  $\log_{\frac{3}{2}} \frac{\sqrt{6}}{3} = -\frac{1}{2}$

Evaluate each expression.

5.  $\log_3 81$

6.  $\log_{10} 0.0001$

7.  $\log_2 \frac{1}{16}$

8.  $\log_{\frac{1}{3}} 27$

9.  $\log_9 1$

10.  $\log_8 4$

Solve each equation.

11.  $\log_4 x = \frac{3}{2}$

13.  $\log_a \frac{1}{8} = -3$

15.  $\log_{\sqrt{5}} y = \frac{4}{3}$

17.  $\log_8(3x + 7) = \log_8(7x + 4)$

19.  $\log_3(9x - 1) = \log_3(4x - 16)$

21.  $\log_5(x^2 - 30) = \log_5 6$

**Practice Worksheet****Logarithms and Logarithmic Functions***Write each equation in logarithmic form.*

1.  $5^3 = 125$   $\log_5 125 = 3$

2.  $27^{\frac{4}{3}} = 81$   $\log_{27} 81 = \frac{4}{3}$

*Write each equation in exponential form.*

3.  $\log_{10} 0.00001 = -5$   $10^{-5} = 0.00001$

4.  $\log_{\frac{3}{2}} \frac{\sqrt{6}}{3} = -\frac{1}{2}$   $\left(\frac{3}{2}\right)^{-\frac{1}{2}} = \frac{\sqrt{6}}{3}$

*Evaluate each expression.*

5.  $\log_3 81$  **4**

6.  $\log_{10} 0.0001$  **-4**

7.  $\log_2 \frac{1}{16}$  **-4**

8.  $\log_{\frac{1}{3}} 27$  **-3**

9.  $\log_9 1$  **0**

10.  $\log_8 4$   **$\frac{2}{3}$**

*Solve each equation.*

11.  $\log_4 x = \frac{3}{2}$  **8**

12.  $\log_y 16 = -4$   **$\frac{1}{2}$**

13.  $\log_a \frac{1}{8} = -3$  **2**

14.  $\log_7 n = -\frac{1}{2}$   **$\frac{\sqrt{7}}{7}$**

15.  $\log_{\sqrt{5}} y = \frac{4}{3}$   **$5^{\frac{2}{3}}$  or  $\sqrt[3]{25}$**

16.  $\log_x \sqrt[3]{9} = \frac{1}{6}$  **81**

17.  $\log_8(3x + 7) = \log_8(7x + 4)$   **$\frac{3}{4}$**

18.  $\log_7(8x + 20) = \log_7(x + 6)$  **-2**

19.  $\log_3(9x - 1) = \log_3(4x - 16)$   
**no solution**

20.  $\log_{12}(x - 9) = \log_{12}(3x - 13)$   
**no solution**

21.  $\log_5(x^2 - 30) = \log_5 6$   **$\pm 6$**

22.  $\log_4(x^2 + 6) = \log_4 5x$  **2, 3**

NAME \_\_\_\_\_

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# Practice Worksheet #3

## Properties of Logarithms

Evaluate each expression.

1.  $n^{\log_n 3}$

2.  $14^{\log_{14} 6}$

Use  $\log_{10} 5 = 0.6990$  and  $\log_{10} 7 = 0.8451$  to evaluate each expression.

3.  $\log_{10} 35$

4.  $\log_{10} \frac{7}{5}$

5.  $\log_{10} 25$

6.  $\log_{10} 490$

7.  $\log_{10} \left(1\frac{3}{7}\right)$

8.  $\log_{10} 0.05$

Solve each equation.

9.  $\log_6 x + \log_6 9 = \log_6 54$

11.  $\log_7 n = \frac{2}{3} \log_7 8$

13.  $\log_9 (3u + 14) - \log_9 5 = \log_9 2u$

15.  $4 \log_2 x + \log_2 5 = \log_2 405$

17.  $\log_{16} (9x + 5) - \log_{16} (x^2 - 1) = \frac{1}{2}$

19.  $\log_6 (3m + 7) - \log_6 (m + 4) = 2 \log_6 6 - 3 \log_6 3$

**Practice Worksheet****Properties of Logarithms****Evaluate each expression.**

1.  $n^{\log_n 3}$  **3**

2.  $14^{\log_{14} 6}$  **6**

**Use  $\log_{10} 5 = 0.6990$  and  $\log_{10} 7 = 0.8451$  to evaluate each expression.**

3.  $\log_{10} 35$  **1.5441**

4.  $\log_{10} \frac{7}{5}$  **0.1461**

5.  $\log_{10} 25$  **1.3980**

6.  $\log_{10} 490$  **2.6902**

7.  $\log_{10} \left(1\frac{3}{7}\right)$  **0.1549**

8.  $\log_{10} 0.05$  **-1.3010**

**Solve each equation.**

9.  $\log_6 x + \log_6 9 = \log_6 54$  **6**

10.  $\log_8 48 - \log_8 w = \log_8 4$  **12**

11.  $\log_7 n = \frac{2}{3} \log_7 8$  **4**

12.  $\log_3 y = \frac{1}{4} \log_3 16 + \frac{1}{3} \log_3 64$  **8**

13.  $\log_9 (3u + 14) - \log_9 5 = \log_9 2u$  **2**

14.  $\log_7 x + \log_7 x - \log_7 3 = \log_7 12$  **6**

15.  $4 \log_2 x + \log_2 5 = \log_2 405$  **3**

16.  $\log_6 (2x - 5) + 1 = \log_6 (7x + 10)$  **8**

17.  $\log_{16} (9x + 5) - \log_{16} (x^2 - 1) = \frac{1}{2}$  **3**

18.  $\log_8 (n - 3) + \log_8 (n + 4) = 1$  **4**

19.  $\log_6 (3m + 7) - \log_6 (m + 4) = 2 \log_6 6 - 3 \log_6 3$  **-1**

20.  $\log_2 (2x + 8) - \log_2 (2x^2 + 21x + 61) = -3\frac{1}{2}$  **-3**